10/017.238 09-02-03

PATENT SPECIFICATION

DRAWINGS ATTACHED

829,179

Date of Application and filing Complete Specification: Jan. 1, 1958.
No. 91/58.
Application made in United States of America on Jan. 9, 1957.
Application made in United States of America on March 8, 1957.
Complete Specification Published: Feb. 24, 1960.

Index at acceptance:—Class 99(1), G18E.

International Classification:—F06l.

COMPLETE SPECIFICATION

Plastic Conduit Joint

We, UNION CARBIDE CORPORATION, a Corporation organised and existing under the Laws of the State of New York, United States of America, of 30, East 42nd Street, New York 17, State of New York, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to heat fusion methods for joining plastic conduit sections and sleeves to form fluid-tight connections with such conduit sections.

Plastic conduit has advantages over metal conduits, but the joining of plastic conduits involves difficulties, particularly when joint strength and corrosion resistance are essential. Previous techniques have required metal surfaces in an otherwise all-plastic system or have required complex connection methods.

According to the present invention a method of joining plastic conduits comprises aligning the conduit ends, applying around the aligned ends a heat conducting sleeve covered with a layer of combustible material, applying, if desired, a layer of plastic intermediate to the conduit and the heat conducting sleeve and igniting the combustible material to transfer heat through the heat conducting sleeve whereby the plastic conduit ends are fixed.

In the accompanying drawings: Figure 1 is a longitudinal section through a plastic joint illustrating the joining of plastic conduits according to the principles of the present invention;

Figure 2 is a similar view as Figure 1 of a modification provided with a stop gap;

Figure 3 is a similar view as Figure 1 of a modification with a heated stop gap;

Figure 4 is a similar view as Figure 1 of a modification with a pull-resistant fitting;

Figure 5 is an elevation partly in vertical longitudinal section through a plastic joint illustrating a reinforcing modification of the present invention;

[*Price 3s. 6d.*]

Figure 6 is an enlarged section of Figure 5, illustrating the completed reinforced joint.

As shown in Figure 1 the apparatus comprises a thin heat conducting sleeve 10 preferably of metal. The sleeve 10 is coated or covered on the outside with a layer 12 of a combustible substance capable of emitting heat when consumed by slowly propagating controlled low ignition or flame. On the inside of the sleeve is preferably provided a thin layer of plastic coating or sleeve 14, preferably of the same plastic as the pipe system.

The diameter of the free inner surface of the combined sleeve is produced to receive standard sizes of plastic pipe or tubing, so that two ends 15 and 16 of such piping can be readily inserted from the opposite ends of the sleeve until they meet each other at the centre of the sleeve. These two ends to be joined are the ends of straight runs, or fittings such as tees or elbows.

To make the joint, the layer 12 is ignited and generates heat which is conducted through the sleeve 10 to melt the outer portions of the pipe ends 15 and 16 and fuse them together. When the inner layer 14 of plastic is provided, the same is fused to the outside of the pipe ends 15 and 16.

As illustrated in Figures 5 and 6, a layer of reinforcing material 23 is preferably applied around the plastic layer 14 and encircled with an additional layer of plastic 14. Ignition by match 21 and burning of the fuel 12 fuses the film 14 together and to the conduit ends 15 and 16. The embedded reinforcement then becomes a part of the fused sleeve and is completely covered and protected by the plastic.

The conduit ends 15 and 16 are of thermoplastic, preferably polyethylene or polyvinyl chloride resin compositions, but may be of other fusible, thermoplastic resin compositions.

The layer of plastic 14 may be a short section of plastic pipe which is used as a sleeve, or a plastic tape wrapped around the conduit ends. It is preferred to use a plastic sleeve or

Price 25p

tape of substantially the same composition as the conduit ends to be jointed therewith.

The reinforcing material 23 is preferably metal screen having from 0.15 to 0.25 mm openings and composed of fine wires approximately 0.125 mm in diameter. The material may also be fiber glass cloth, fabric woven from high density polyethylene or natural or synthetic fiber with a coarse weave. Polyethylene coated aluminium foil may also be used. The reinforcing material 23 may be a shorter and slightly narrower strip secured intermediate the ends and edges of a longer and slightly wider length of plastic tape, whereby the wrapping forms a layer of reinforcing material enclosed between layers of plastic and having a total thickness preferably of the order of 1.25 to 1.65 mm. after fusion.

The heat baffle 10 is preferably a thin copper sleeve from 0.075 to 1.25 mm in thickness. Although the presence of a sleeve 10 of metal over the plastic union lends greater strength support and protection to the joint, in cases where metals cannot be tolerated or where special appearance is important, the metal sleeve 10 is removed after the tubes have been joined. For this purpose the sleeve 10 is constructed of thin metal foil which may be torn off along with the burned out layer 12 of combusted material after the plastic has been firmly fused.

The plastic layer 14, heat baffle 10 and fuel 12 can be manufactured as a complete self-contained unit ready for use. In another example, a sleeve is formed from plastic film 14 containing an embedded reinforcing member 23 and the ends are heat sealed. A preformed heat baffle 10 and fuel sleeve 12 receives the reinforced film sleeve to complete the unit. The diameter of the free inner surface of the combined sleeve is produced to receive standard sizes of plastic pipe or tubing, so that the two ends 15 and 16 of such piping can be readily inserted from the opposite ends of the sleeve until they meet each other at the center of the sleeve.

In the preformed sleeve shown in Fig. 2, the heat conductive sleeve 10 is provided with an internal annular shoulder 18, against which the pipe ends 15 and 16 abut to center them inside the sleeve. The plastic layer 19 is recessed as at 20 to fit between the pipe ends.

In the form shown in Fig. 3, the heat conductive sleeve 10 is provided with a wider annular shoulder externally grooved as at 22, to bring the combustible layer 12 closer to the joint to be fused.

In the form shown in Fig. 4, the sleeve 10 is provided with inturned terminal flanges 24 to grip the joint and provide longitudinal strength. The internal plastic coating or layer 14 on the sleeve fuses with the outside surface of the two sections of plastic pipe and the flanges 24 clamp or grip the layer 14 on both ends to lend additional strength.

WHAT WE CLAIM IS:—

1. A method of joining plastic conduits, which comprises aligning the conduit ends, applying around the aligned ends a heat conducting sleeve covered with a layer of combustible material, applying, if desired, a layer of plastic intermediate to the conduit and the heat conducting sleeve, and igniting the combustible material to transfer heat through the heat conducting sleeve whereby the plastic conduit ends are fused.

2. A method as claimed in claim 1, in which the heat conducting sleeve is provided with an annular shoulder against which the conduit ends abut.

3. A method as claimed in claim 1 or claim 2, in which the intermediate layer or plastic is the same material as the conduit ends.

4. A method as claimed in any one of claims 1, 2 or 3, in which the layer of plastic is a preformed sleeve.

5. A method as claimed in any one of claims 1, 2 or 3, in which the layer of plastic is formed from plastic tape.

6. A method as claimed in any one of claims 2 to 5 which comprises applying a layer of reinforcing material around the plastic layer and encircling such reinforcing material with an additional layer of plastic.

7. A method as claimed in claim 6, in which the reinforcing material is metal screening.

8. A method as claimed in any one of the preceding claims in which the heat conducting sleeve is metal foil.

9. A method of joining plastic conduits substantially as hereinbefore described.

10. A sleeve for use in the method as claimed in claim 1, such sleeve being heat conductive and covered with a layer of combustible material, the ends of the sleeve being adapted to receive the conduit ends.

11. A sleeve as claimed in claim 10, in which a plastic tube is disposed within the heat conducting sleeve, and the ends of the plastic tube are adapted to receive the conduit ends.

12. A sleeve as claimed in claim 11, in which a reinforcing material is embedded in the plastic tube.

13. A sleeve for joining plastic conduits substantially as hereinbefore described and shown in the accompanying drawings.

BOULT, WADE & TENNANT,
111 & 112, Hatton Garden, London E.C.1.
Chartered Patent Agents.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1960.
Published by The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

FIG.1.

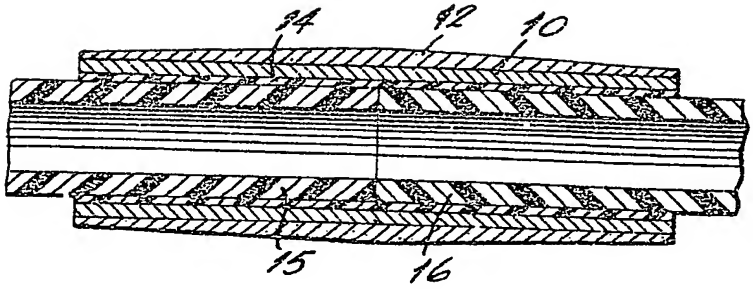


FIG.2.

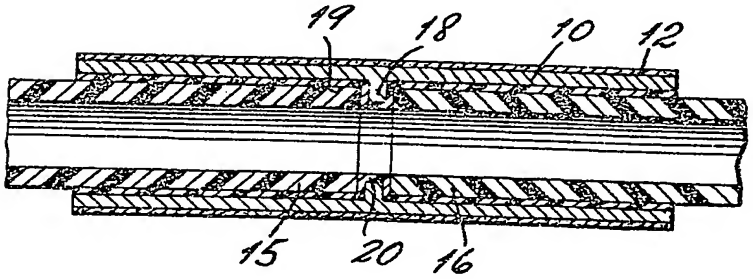


FIG.3.

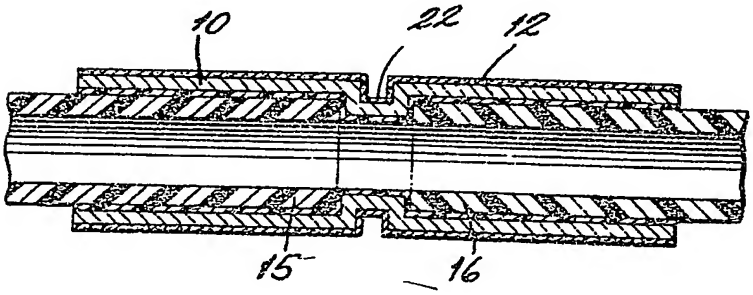
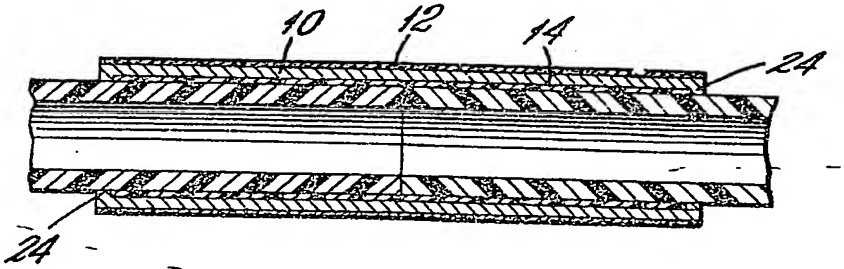


FIG.4.



829,179 COMPLETE SPECIFICATION
2 SHEETS
This drawing is a reproduction of the Original on a reduced scale.
SHEETS 1 & 2

FIG. 5.

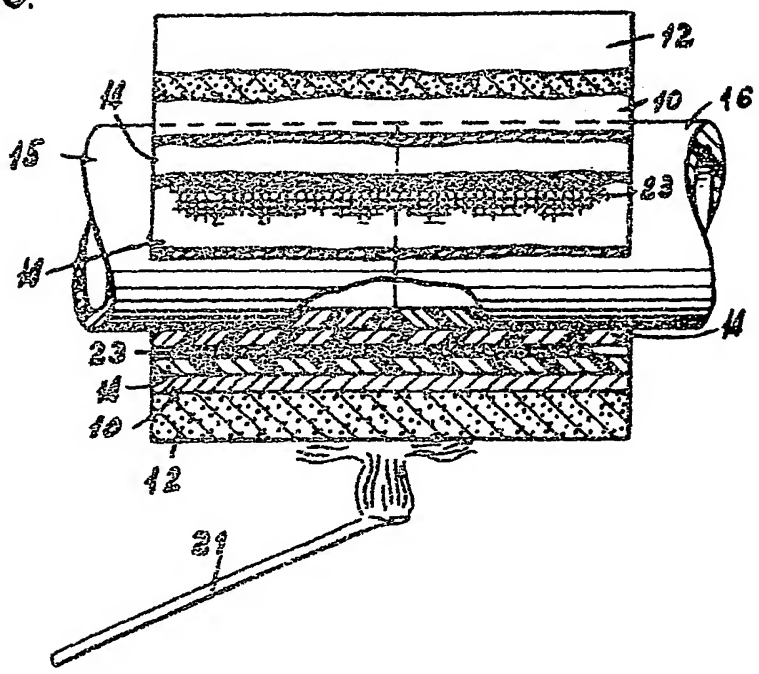
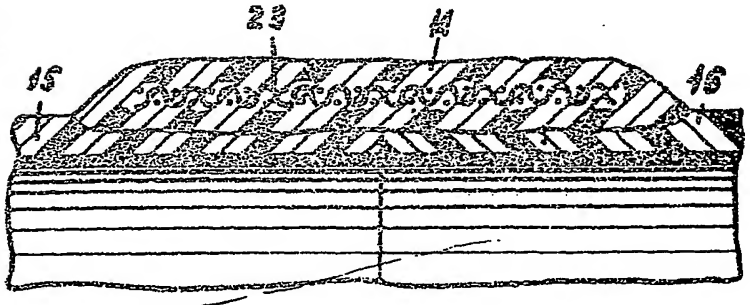


FIG. 6.



829,179 COMPLETE SPECIFICATION
2 SHEETS

This drawing is a reproduction of the Original on a reduced scale.
SHEETS 1 & 2

FIG.1.

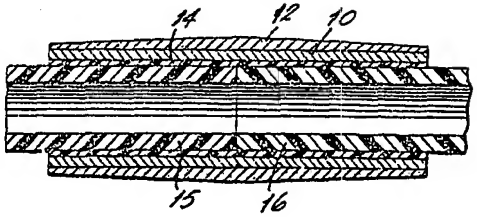


FIG.2.

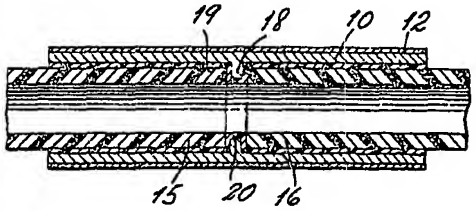


FIG.3.

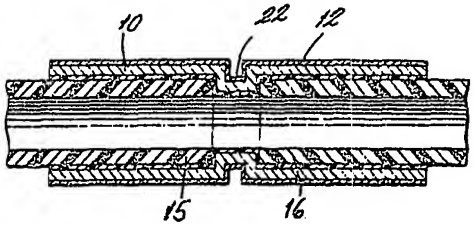


FIG.4.

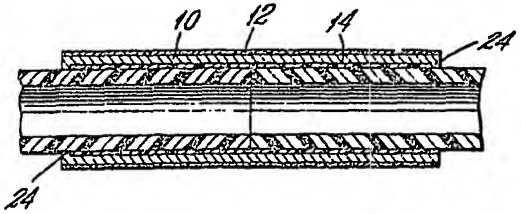


FIG.5.

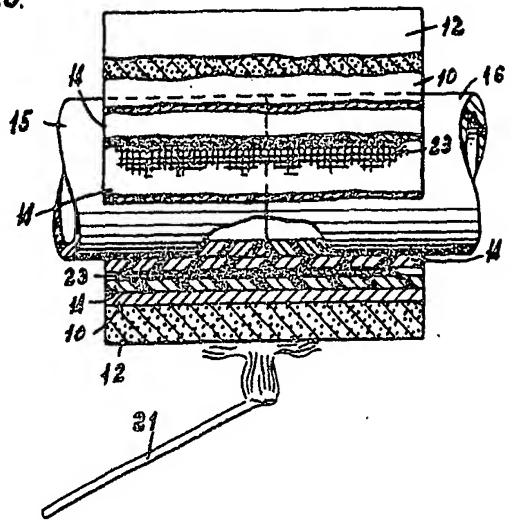


FIG.6.